

PhD in Mechanical Engineering

Research Area n. 2 - Machine and Vehicle Design

Specific Research Subject: Structural integrity of turbine components

Cluster Tecnologico Nazionale_Greening the Propulsion

Scholarships and Financial support	
Monthly net income of PhD scholarship (max 36 months)	€ 1200 (In case of a change of the welfare rates during the three-year period, the amount could be slightly modified)
Number of scholarships	1
Beginning of PhD	1/5/2015
Deadline for application	23/03/2015
Context of the research activity	
Motivations and objectives of the research in this field	<p>Turbine components are subjected to the fatigue cycles (both LCF and HCF) in which there is a superposition of mechanical stresses with thermal induced stresses. The damage mechanisms are then controlled the stress- strain-temperature cycles, which depend on the component morphology (coating, shape).</p> <p>The research will be dedicated to structural integrity assessment by developing models for some of the damage mechanisms as well as by characterization of advanced materials.</p>

Methods and techniques that will be developed and used to carry out the research	Methods that will be adopted: i) HT characterization of materials (fatigue, fracture, propagation of small cracks); ii) numerical/analytical models for damage in different regions of the turbine components; iii) advanced models (crystal plasticity, DIC) for analysing crack tip irreversibility under fracture and fatigue.
Educational objectives	The aim of the position is to educate an expert in structural integrity mastering the most advanced models for describing material and reliability degradation in turbine components.
Job opportunities	The successful PhD could be employed in positions for: i) structural integrity expert; ii) design engineer for turbine components; iii) maintenance and reliability management. The prospective employers for such positions are aeroengine, gas turbine, component manufacturing companies.
Composition of the research group	1 Full Professor 2 Associate professors 1 Assistant Professor 1 Post Doc 3 PhD Students
Names of the research directors	Prof. Stefano Beretta
E-mail address, phone number and web-page	stefano.beretta@polimi.it ph: 02-23998246
List of 5 Universities, Companies, Agencies and/or National or International Institutions that are cooperating in the research	1. University of Illinois at Urbana Champaign 2. AVIO Aero 3. Politecnico di Torino 4. Petroceramics 5. TU Darmstadt
Additional support	
<u>Educational activities</u> (purchase of study books and material, funding for participation in courses, summer schools, workshops and conferences): financial aid per PhD student per year	2 nd year: 1.370 euro per student 3 rd year: 1.370 euro per student
<u>Teaching assistanship:</u> availability of funding in recognition of supporting teaching activities by the PhD student	There are various forms of financial aid for activities of support to the teaching practice. The PhD student is encouraged to take part in these activities, within the limits allowed by the regulations.
<u>Computer availability:</u>	1 st year: <i>individual use</i> 2 nd year: <i>individual use</i> 3 rd year: <i>individual use</i>
<u>Desk availability:</u>	1 st year: <i>individual use</i> 2 nd year: <i>individual use</i> 3 rd year: <i>individual use</i>